Novel Electrochemical Sensor for Highly Sensitive Detection of Adenine Based on Vanadium Pentoxide Nanofibers Modified Screen Printed Carbon Electrode

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doi: 10.20964/2018.07.41

Received: 24 March 2018 / Accepted: 6 May 2018 / Published: 5 June 2018

Herein, we report a simplistic approach to prepare vanadium pentoxide nanofibers (V₂O₅ NFs) using simple hydrothermal method. The as-synthesized material was confirmed by X-ray diffraction (XRD), energy dispersive X-ray spectroscopy (EDX) techniques, scanning electron microscopy (SEM). In addition, V₂O₅ NFs was used as an electrocatalytic performance towards the electro-oxidation of Adenine. Interestingly, V₂O₅ NFs modified electrode (V₂O₅ NFs/SPCE) showed an excellent electrocatalytic activity towards Adenine with lower detection limit (0.013 μM), wide linear ranges (0.5 to 512 μM) and the higher sensitivity about 8.5333 μA μM⁻¹ cm⁻². Furthermore, V₂O₅ NFs/SPCE was also demonstrated good recovery even in real human urine samples. This study opens a new window for the trace level identification of biological molecules in real samples.

Keywords: Vanadium pentoxide, nano-fibers, Adenine, electro-oxidation, human urine sample.

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